given to selfing of individual plants with some success. In order to hasten the work, winter seed growing in the greenhouse or out-of-doors in the southern states was practiced with moderate success.

Seedsmen and growers are interested in the possibility of producing seed of these resistant strains in the commercial cabbage seed growing sections. The difficulty encountered in this procedure lies in the fact that yellows does not occur generally in our seed growing sections. The small percentage of susceptible plants would thus not be eliminated, and tendency toward reversion would be expected. The investigators have studied this question by having a resistant strain grown for one generation in the Puget Sound seed growing section, and then testing it on diseased soil together with Wisconsin grown strains. Little or no reversion was noted when this was carried on for only one generation. The practice, therefore, is being approved for the present provided precautions are taken to supply stock seed each year from plants selected on diseased soil, and to so isolate seed fields as to avoid all possibility of cross-pollination with other varieties.—J. C. WALKER.

Abnormal behavior in corn endosperm.—If pollen from red grained corn be applied to the silks of a colorless grained variety, the resulting grains will be red. This familiar phenomenon of xenia is explained by the known facts of double fertilization. This cross, however, may produce a very few aberrant grains; of these, only a part of the surface is red and the rest colorless. Such grains are commonly spoken of as "mosaics," while the terms "mottled," "spotted," and "variegated" usually refer to different phenomena. WEBBER[11] observed this phenomenon, and suggested two possible explanations: (1) the second male nucleus fails to fuse with the female fusion nucleus, and these two elements divide independently in producing endosperm; (2) the second male nucleus fuses with one of the female polars, the other polar dividing independently in the production of endosperm.

The first explanation was disproved by EAST[12] in the following manner. Factors *R* and *C* must be present simultaneously for the production of red endosperm. A cross between the two colorless grained types, *CCrr* and *ccRR*, therefore, will produce a red grained ear. Even here, however, aberrant grains sometimes appear, part of the grain being white and the rest colorless. Failure of the second male nucleus to fuse with the female polar nucleus in such a case would result in a grain which was entirely colorless, a thing which never occurred. It is only by fusion of male and female nuclei that any part of the endosperm can be red.

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[11] WEBBER, H. J., Xenia, or the immediate effect of pollen in maize. U.S. Dept. Agric., Div. Veg. Phys. Path. Bull. 22:1–44. 1900.

[12] EAST, E. M., Xenia and the endosperm of angiosperms. BOT. GAZ. 56:217–224. 1913.

WEBBER'S second explanation was disproved by EMERSON[13] as follows. A colorless, sugary type, *CCrrsusu*, was used as female parent in a cross with a colorless, starchy type, *ccRRSuSu*. The resulting grains were red, starchy, save for a few aberrant grains which were red in part and colorless in part but starchy throughout. WEBBER'S second explanation fails here, since fusion of the second male nucleus with only one of the polars would produce grains which were red, starchy in part (from male nucleus fused with one polar) and colorless sweet in part (from independent polar).

These two critical experiments serve to disprove WEBBER'S explanations and demonstrate that the normal program of double fertilization is invariable in corn. The next thing which was invoked to explain these aberrant grains was "somatic mutation" in the endosperm, but for several reasons this was unsatisfactory as an explanation.

EMERSON[14] has finally obtained critical evidence which indicates a very satisfactory explanation of the phenomenon. The factor *wx* for waxy endosperm (*Wx*, corneous endosperm) is known to be carried on the same chromosome with the *C* factor. A cross was made between a colorless, waxy female parent, *c-wx c-wx* and a red corneous male parent, *C-Wx C-Wx* (the *R* factor being present in both parents). The resulting triploid endosperm was of the formula *c-wx C-wx C-Wx*. If non-disjunction (passing of both halves of a divided chromosome to one pole) occurred in connection with the third of these chromosomes, one of the resulting nuclei would be diploid for this chromosome set. *c-wx c-wx*, and the other tetraploid, *c-wx c-wx C-Wx C-Wx*. Endosperm produced by the former should be colorless, waxy; endosperm produced by the latter should be red, corneous. Emerson obtained aberrant grains which were of exactly this constitution, the colorless areas being at the same time waxy, and the red areas corneous. This experiment, considered together with the previous ones, indicates that occasional non-disjunction is the explanation of these aberrant grains. The frequency of these particular aberrant grains is one in 423, and one may expect non-disjunction to take place in connection with some one chromosome in the corn endosperm in about one of every fourteen grains. Direct cytological demonstration is to be hoped for. Non-disjunction is known to occur at times elsewhere in the plant and animal kingdoms. Possibly the triploid nature of endosperm furnishes an especially favorable condition for its occurrence.—M. C. COULTER.

Prairie vegetation.—The prairies of Illinois, occurring as they do on the tension line between great forest and and grassland formations of North America, afford peculiar advantages in the study of the development of this

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[13] EMERSON, R. A., Anomalous endosperm development and the phenomenon of bud sports. Zeit. Induk. Abstamm. Vererb. **14**:241–259. 1915.

[14] EMERSON, R. A., Genetic evidence of aberrant chromosome behavior in maize endosperm. Amer. Jour. Bot. **8**:411–424. *fig. 1.* 1921.